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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/574,680	04/04/2006	Markus Siegert	12810-00232-US	1729
23416 7590 11/25/2008 CONNOLLY BOVE LODGE & HUTZ, LLP P O BOX 2207 WILMINGTON, DE 19899				
EXAMINER KATAKAM, SUDHAKAR				
ART UNIT 1621		PAPER NUMBER		
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/574,680

Applicant(s)

SIEGERT ET AL.

Examiner

Sudhakar Katakam

Art Unit

1621

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 12 August 2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 and 19-40 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 and 19-40 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-8508)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

Status of the application

1. Receipt of Applicant's remarks and arguments filed on 12th Aug 2008 is acknowledged.
2. With regard to the 103(a) rejection, the applicants' arguments are not found persuasive. However, upon further consideration, in view of applicants' amendments to the claims and addition of new claim, a new ground(s) of rejection is made in view of different interpretation of the previously applied reference, and provide an explanation of the rejection.
3. Claim 18 has been cancelled.
4. Claims 10-12, 17, 31 and 36 have been amended.
5. Claims 1-17 and 19-40 are discussed on the merits in this action.

Response to Arguments

6. Applicant's arguments filed on 12th Aug 2008 have been considered but they are not persuasive.

The thrust of the applicants' arguments is that the disclosure of **Hara et al** concerning the separation of distillation only represents the general knowledge of a person skilled in the art and does not give any hint how to separate the mixture concretely, and **Hara et al** does not use one or more dividing wall columns for the separation of the ethyleneamines mixture. Applicants' also argue that neither **Hara et al** nor **Kaibel** nor any other document of the general state of the art of distillation teaches

the separation of the mixture into its components according to the claim herein to produce various products with high purity and high color quality.

The examiner does not find these arguments persuasive. The examiner agrees that **Hara et al** do not teach the dividing wall columns for the separation of the ethyleneamines mixture. However, it teaches the use of distillation as a tool to separate the components in the mixture. **Kaibel** teaches the advantages of the use of one or more dividing wall columns for the distillative separation of mixtures which contain three or more components, and also suggested that dividing wall columns make it possible to obtain pure products by a simple, economical and efficient method. High quality products with regard to color, color stability, odor and purity are thus produced. Therefore, a skilled person would be motivated to apply **Kaibel's** teachings, such as dividing wall columns, for the separation of the ethyleneamines mixture, and to obtain high purity and color stable compounds with a reasonable expectation of success.

Applicants show how the cited references differ from the instant invention, but the obviousness test under 35 U.S.C. 103 is whether the invention would have been obvious in view of the prior art taken as a whole. In re Metcalf et al. 157 U.S.P.Q. 423.

Applicants allege that they obtained the high purity and high quality of the products from their process. However, applicants are not shown beneficial side by side comparison with the closest prior art.

So, it would have been obvious to a person of ordinary skill in the art at the time of the invention to combine the teachings of **Hara et al** and **Kaibel**, and to arrive at

instant claims with a reasonable expectation of success. One would be motivated to combine the teachings to get a better yield of the compounds, since it is within the scope to optimize the conditions through a routine experimentation.

7. Also please see the new grounds of rejection below.

Specification

8. The specification is objected to under 37 C.F.R. 1.74, because no section headed "Brief Description of the Drawings" is present therein. It is suggested that applicants amend the specification so that such a section is introduced.

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. Claims 1-17 and 19-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Hara et al** (US 5,248,827) in view of **Kaibel** (Chem.Eng.Technol. 10, 1987, 92-98).

Hara et al teaches a process for producing an ethylenamine, which comprises reacting ammonia with an ethanolamine, such as monoethanolamine, and the formed ethylenamines are ethylenediamine (EDA), diethylenetriamine (DETA), triethylenetetramine (TETA), tetraethylenepentamine (TEPA), piperazine (PIP), monoethanolamine (MEA), and N-(2-aminoethyl)ethanolamine (AEEA) etc. [col. 5, lines 1-17]. **Hara et al** also teach that the formed ethylenamines are separated into the respective components by distillation and the distillation may be conducted in a batch system or in a continuous system [col.6, lines 25-36].

The difference between the **Hara et al** and the instant claims is that **Hara et al** is silent on using the dividing wall columns for the distillation to separate the ethylenamines. However, **Kaibel** cures this deficiency.

Kaibel teaches distillation columns with vertical partitions and their advantages in separating feed mixtures into their individual components. These distillation columns can separate a feed mixture into 3 or 4 pure fractions in a single distillation step [see Fig. 1]. **Kaibel** also teaches that the basic principle of vertical partitions can be extended and the addition of further partitions in theory permits the separation of feed streams into any number of pure fractions [see Fig.5 in page 94]. **Kaibel** also teach the theoretical trays in the distillation column and showed the performance of a distillation column with a vertical partition between the 20th and the 40th theoretical tray (see Fig. 8). The location of the feed and the side outlet are at the same height in the column. Depending on relative volatilities of the components, a further optimization with regard to energy consumption may be achieved when the feed and the side outlet are at

different heights in the column. In the present example, the feed inlet would be lower than the side outlet and the purity of the medium boiling component would be further increased [see column 2 in page 95]. The distillation column with a vertical partition permits the medium boiling components to distill both to the upper and lower ends of the partition and to recombine in the outlet section. **Kaibel** teach the advantages of distillation columns with the vertical partitions. These are capable of separating a feed mixture into 3 or 4 pure fractions. This is advantageous especially for heat sensitive components. These can be separated from their higher and lower boiling impurities at a lower thermal stress. In this way better product qualities were obtained in production columns [see page 98 under 'Applications']. Figure 2 shows the thermally coupled distillation columns.

In summary, **Hara et al** teaches a process for production of ethylenamines, and also teach that the formed ethylenamines are separated into the respective components by distillation and the distillation may be conducted in a batch system or in a continuous system. **Kaibel** teaches distillation columns with vertical partitions and their advantages in separating feed mixtures into their individual components.

Dividing wall column for the distillation are known in the art and are not novel. Applicants specification acknowledges various dividing wall type distillation columns and their control strategies in the separation of chemicals. However, no process for separation of mixtures containing ethylenamines is explicitly taught in the prior art. So, with respect to the separation process there described will lie in whether or not application of a dividing wall column in the separation of ethylenamines is obvious.

The claims would have been obvious because, a person of ordinary skill has a good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product, not of innovation, but of ordinary skill and common sense.

The claim would have been obvious because the design incentives or market forces provided a reason to make an adaptation, and the invention resulted from application of the prior knowledge in a predictable manner.

All the claimed elements were known in the prior art and one skilled person in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded predictable results to have yielded predictable results to one of ordinary skill in the art at the time of the invention.

The Supreme Court in KSR noted that if the actual application of the technique would have been beyond the skill of one of ordinary skill in the art, then the resulting invention would have been obvious because one of ordinary skill could not have been expected to achieve it.

Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to apply the distillation columns with vertical partitions to separate the ethylenamines into their individual components with the predictable expectation success. Therefore, one of ordinary skill artisan in the art would have been motivated to combine the teachings of the references in order to arrive at the alternative

method for separating the ethylenamines. For the foregoing reasons the instantly claimed process is made obvious.

12. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Conclusion

13. No Claim is allowed.

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sudhakar Katakam whose telephone number is 571-272-9929. The examiner can normally be reached on M-F 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Daniel Sullivan can be reached on 571-272-0779. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

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USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Sudhakar Katakam/

Examiner, Art Unit 1621

/Jafar Parsa/

Primary Examiner, Art Unit 1621